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August 25, 1983

Mr. Donald J. Thimsen, P.E.
Manager, Environmental Engineering
Engineering Policy
General Mills, Inc.
P.O. Box 1113
Minneapolis, Minnesota 55440

Dear Mr. Thimsen:

This letter summarizes our recommendations for a remedial action plan at the solvent disposal site on the Henkel property. Our recommendations are consistent with the discussion with the MPCA on July 12, meetings in your office since that time, and with the MPCA's August 2, 1983 letter. While the MPCA favors some type of source control, it is evident that the Agency also favors remedial measures and additional investigations of the Platteville aquifer to limit the migration of contamination to the lower aquifers.

Based on the discussions with the MPCA staff, we recommend that the following remedial action plan be pursued during the next 2 to 4 months:

1. A shallow groundwater pump-out system with the artificial recharge of potable water should be evaluated as a cost-effective means of reducing soil concentrations in the immediate vicinity of the disposal site.

2. The use of a shallow groundwater pump-out after use of the shallow groundwater pump-out/artificial recharge system has been discontinued.

3. A Platteville (Carimona) groundwater pump-out system.

The decision as to the placement of a St. Peter monitoring well should be delayed pending the development of an accurate cost estimate for such a well and a determination regarding whether another well is needed for water supply purposes either for the recharge system or for use by Henkel.

Shallow Groundwater Pump-Out/Artificial Recharge System

We have reviewed OH Materials' proposal for an "aggressive" shallow groundwater pump-out system. While we recommend that a limited amount of analysis be carried out to check the well locations and pumping rates to be

reasonably sure that the outside recovery wells capture the recharged water, we believe that the concept is logical. The success of the system is obviously tied to the ability of the recharged water to wash the solvents out of the soil. This is a function of the amount of water put through the system and the form of the solvents in the unsaturated and saturated zones. If the OH Materials' proposal is accepted, we recommend that either a pre-defined "post-operational" solvent concentration in the soil or groundwater in the 50-foot diameter circle around the disposal site be established as the basis for success.

Continued Shallow Groundwater Pump-Out

Once the shallow groundwater pump-out/artificial recharge system has been operated for a long enough period of time that the average solvent concentration in the soil or in the groundwater has been decreased to the agreed upon concentration, it may be advantageous to continue the shallow groundwater pump-out system using the outside recovery wells. We estimate that the four shallow groundwater recovery wells pumping at a combined rate of 80 gpm will collect groundwater from an area about 1,000 feet wide.

Platteville Pump-Out System

The following steps are recommended for evaluating the feasibility of a Platteville pump-out system:

1. Test Pump Well 8 -- Platteville-Carimona Well 8 should be pumped at the aquifer's capacity (likely about 10 gpm) and the resulting drawdown should be measured to determine the hydraulic characteristics of the Carimona aquifer. The discharge should go to the storm sewer system and samples should be collected from the outlet of the storm sewer to define the degree of treatment provided in the storm sewer system. Observations should be made along the route of the sewer to detect any potential problems with odors from catch basins.

2. Place and Test Pump Platteville-Carimona Well on Henkel Property -- The purposes of this well will be to define the quality of groundwater in the Carimona directly beneath the site, to define the area within which groundwater can be collected by a well at this location, to provide water for treatability testing, and for use as an eventual Platteville pump-out well. This well should be test pumped after placement and drawdowns should be measured in Wells BB, WW, II, VV, other adjacent wells, and in the pumping well to determine the area influenced by the well. The results of the test pumping of Well 8 should be used to determine whether this well should be 4 inches or 6 inches in diameter.

3. Conduct Treatability Tests -- Limited bench-scale or pilot-scale treatability tests should be conducted on the water from the new Henkel Platteville well to determine the degree of treatment that can be achieved with simple air stripping. Meetings should also be scheduled with the MPCA and MWCC to discuss discharge limitations.

4. Place Additional Platteville Monitoring Wells -- Additional Platteville monitoring wells are recommended at the four locations shown in Figure 1 accompanying this letter. The purpose of these wells is to define solvent concentrations in the Carimona at locations east and south of the site. This information is needed to better define the area that must be captured by the Platteville pump-out system. If samples from these wells show low concentrations of solvents, the wells will be important components of the eventual groundwater monitoring system. As shown, one additional Platteville monitoring well is also recommended northwest of the site to better define piezometric levels in that area.

The above four tasks will provide information on the capture area of a Carimona well on the Henkel property and on the need for additional Carimona pump-out wells, and will likely provide necessary long-term monitoring wells for the clean-up.

The existing Platteville wells and piezometers should also be resampled to provide additional information on variations that are occurring in Platteville water quality. These samples should be collected at the time the new wells are sampled.

The MPCA also requested additional information on the extent of the plume in the shallow groundwater around the site. You recall that we only sampled the shallow monitoring wells in the direction of groundwater movement southwest of the site and Piezometer B and Well 1 immediately north of the site. The most cost-effective way to provide additional data on the quality of the shallow groundwater will be to sample the shallow small diameter piezometers for the indicator solvents.

If you have any questions about these recommendations, please contact me.

Sincerely,

Allan Gebhard

AG/tmn

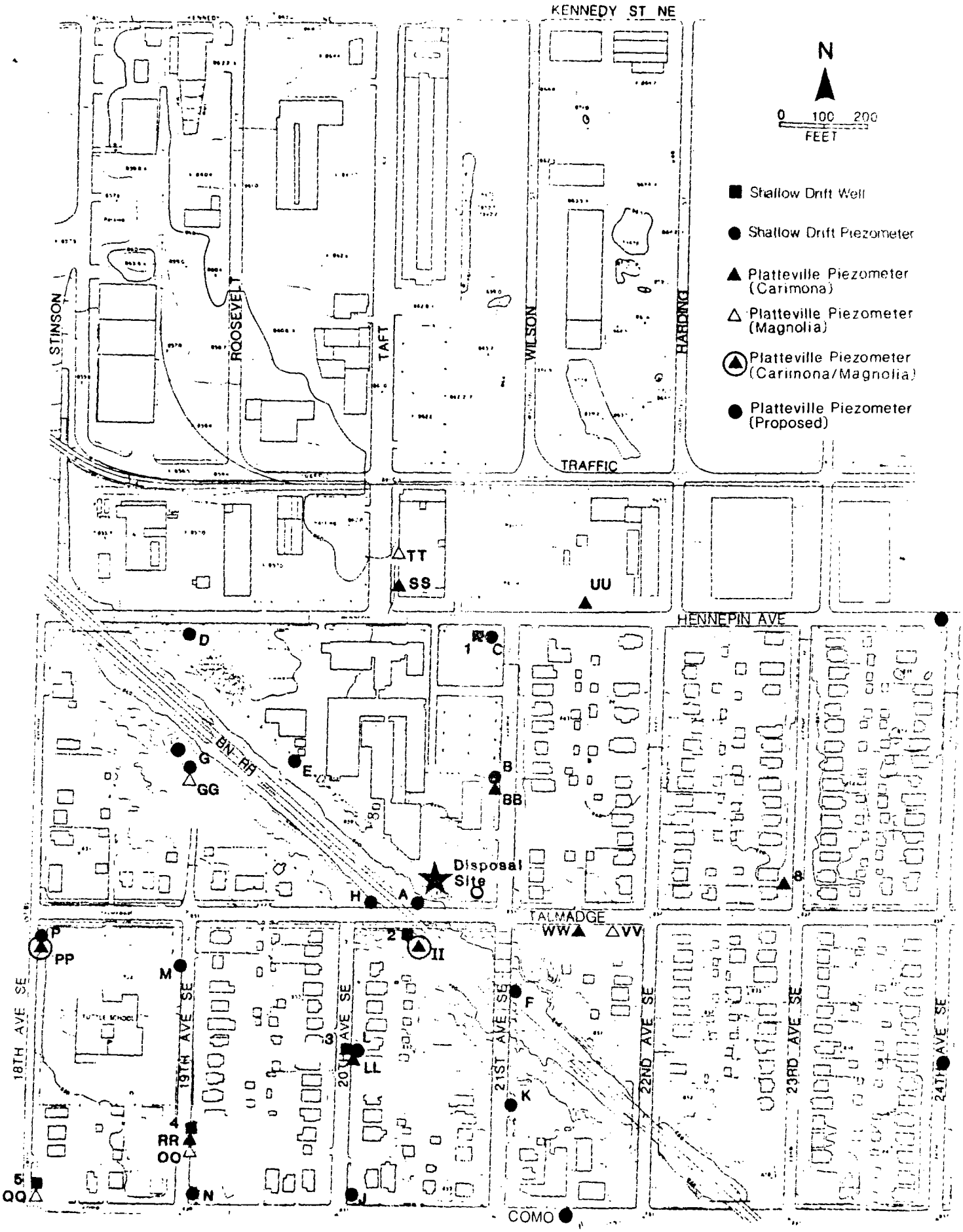

Figure 1

RECOMMENDED LOCATIONS FOR ADDITIONAL PLATTEVILLE CARIMONA WELLS